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(21) Application number: **98106843.0**

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**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
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(71) Applicant: **MOTOROLA, INC.**
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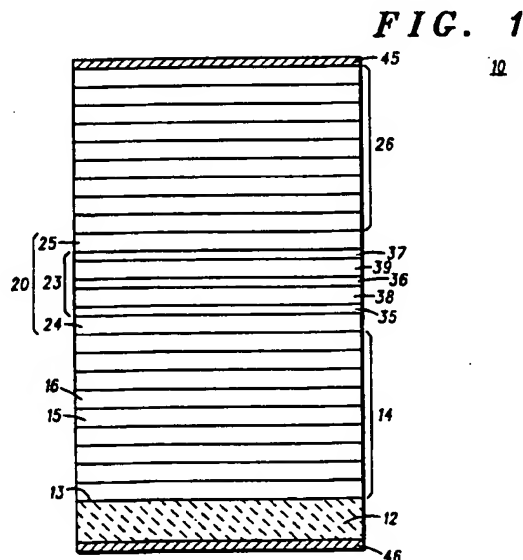
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(54) **Long wavelength VCSEL**

(57) A VCSEL for emitting long wavelength light including a GaAs (111) substrate element (12), a first mirror stack (14) with mirror pairs in a GaAs/AlGaAs material system lattice matched to a GaInAsN active region (20) with an active structure (23) sandwiched between a first cladding region (24) adjacent the first mirror stack (14) and a second cladding region (25), the active structure (23) including a nitride based quantum well (35, 36, & 37), and a second mirror stack (26) lattice matched to the second cladding region (25) and having mirror pairs in a GaAs/AlGaAs material system.





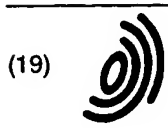
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EUROPEAN SEARCH REPORT

Application Number
EP 98 10 6843

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|--|---|--|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
| Y | T MIYAMOTO, T. TAKADA, ET AL: "Design and expected characteristics of 1.3 μ m GaInNAs/GaAs vertical cavity surface emitting lasers" QUANTUM OPTOELECTRONICS 1997, TECHNICAL DIGEST SERIES, POSTCONFERENCE EDITION, , vol. 9, 19 - 21 March 1997, page 126-128 XP002075850 Incline Village NV USA * the whole document * | 1-9 | H01S3/19 H01S3/085 |
| Y | US 5 383 211 A (VAN DE WALLE CHRIS ET AL) 17 January 1995 * column 5, line 19-39 * | 1-9 | |
| A | KONDOW M ET AL: "A NOVEL MATERIAL OF GAINAS FOR LONG-WAVELENGTH-RANGE LASER DIODES WITH EXCELLENT HIGH-TEMPERATURE PERFORMANCE" INTERNATIONAL CONFERENCE ON SOLID STATE DEVICES AND MATERIALS, 21 August 1995, pages 1016-1018, XP000544869 * the whole document * | 1-9 | TECHNICAL FIELDS SEARCHED (Int.Cl.6) H01S |
| A | EP 0 723 303 A (HEWLETT PACKARD CO) 24 July 1996 * the whole document * | 1-9 | |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 28 August 1998 | Examiner Claessen, L |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document | | | |

EPO FORM 1503 03/82 (P04C01)



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(11) EP 0 874 428 A3

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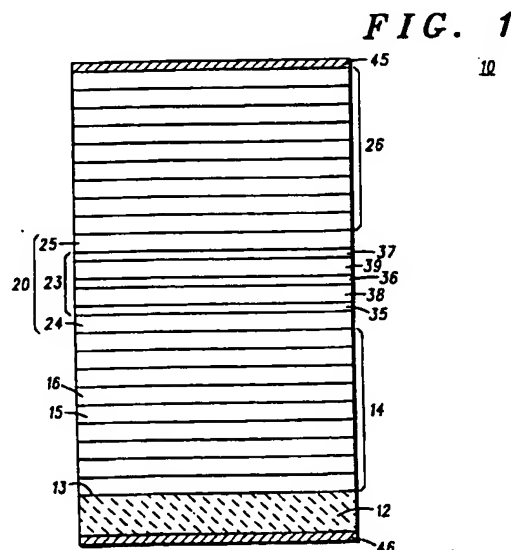
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EPO FORM 1503 03 82 (P4/C01)

Long wavelength VCSEL

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Publication date: 1998-10-28
Inventor(s): RAMDANI JAMAL (US); JIANG WENBIN (US); LEBBY MICHAEL S (US)
Applicant(s):: MOTOROLA INC (US)
Requested Patent: ☐ JP10303515
Application EP19980106843 19980415
Priority Number(s): US19970839112 19970423
IPC Classification: H01S3/19 ; H01S3/085
EC Classification: H01S5/183, H01S3/19B4C4A
Equivalents: TW396668, ☐ US5943359

*on net drive***Abstract**

A VCSEL for emitting long wavelength light including a GaAs (111) substrate element (12), a first mirror stack (14) with mirror pairs in a GaAs/AlGaAs material system lattice matched to a GaInAsN active region (20) with an active structure (23) sandwiched between a first cladding region (24) adjacent the first mirror stack (14) and a second cladding region (25), the active structure (23) including a nitride based quantum well (35, 36, & 37), and a second mirror stack (26) lattice matched to the second cladding region (25) and

having mirror pairs in a GaAs/AlGaAs material system. 

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